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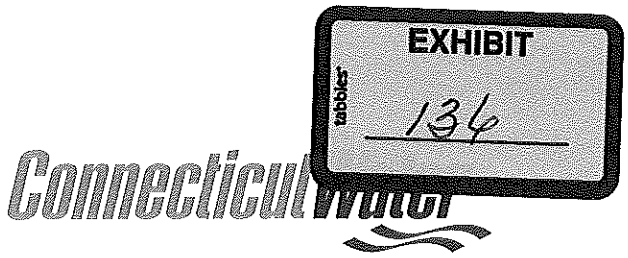

February 1, 2010

Paul Stacey
State Department of Environmental Protection
79 Elm Street
Hartford, CT 06106

Re: Proposed Stream Flow Regulations

Dear Mr. Stacey:

The Connecticut Water Company is pleased to provide testimony on the Department's proposed streamflow regulations. The Company staunchly supports the legislative intent behind these regulations; indeed, Connecticut Water's involvement began with the negotiations that resulted in adoption of the underlying legislation in 2005 and continued through our service on the various advisory groups formed by the Commissioner. We believe we have acted in good faith during the negotiations and regulatory discussions to date and will continue to work with the Department and numerous stakeholders to achieve meaningful water management policies for the State.

In addition to supplying water for commercial, industrial and public sector customers, approximately 300,000 Connecticut residents rely daily on the Company's piped water service for their drinking, cooking, bathing, sanitation and other essential domestic needs. To ensure we meet those needs, the Company maintains supplies having a capacity to provide some 50 million gallons of fresh water daily; we operate and maintain an extensive infrastructure system consisting of numerous pumping and treatment facilities and over 1,500 miles of water transmission and distribution piping; and we own and actively manage more than 6,000 acres of watershed and aquifer lands to preserve and protect the quality of our supplies.

We recognize that our operations, by their very nature, can have an environmental impact and we have long championed efforts to protect and preserve the natural environment. Water is a precious natural resource and we are committed to being good stewards of the environment and in managing our resources in a manner that promotes water conservation, source protection, and preservation of open space while meeting our customers' needs.

Quite frankly, we understand this is something the public trusts us to do – to be responsible stewards of the land and water resources, while at the same time delivering an adequate supply of high-quality drinking water to our customers' taps each and every day. Arguably, water utilities alone carry the dual responsibility of Environmental Stewardship and Public Health, and we are very conscious of the potential the proposed streamflow regulations have to either promote or upset that equilibrium.

Legislative Intent and Finding the Right Balance

Senator Andrew Roraback, a leading proponent of the legislation, understood the need to get the balance right. When discussing the underlying bill, he presciently noted:

"So we really need to strike the balance between ensuring a safe and adequate supply of public drinking water, while at the same time allowing any water that's not needed for that purpose to make its way downstream, as it would were the impoundment not there."[1]

That statement succinctly captures the essence of the legislation, as well as the challenge of writing regulations: How do we best achieve some greater balance where impoundments currently exist and by that very existence, affect the natural flow of water? That challenge is made greater still because we are dealing with water supply reservoirs that were constructed, in many cases, over a hundred years ago. Many are legacies of our industrialized past when water supply systems were built to serve newly developing urbanized areas and mill towns. They were built in pristine areas, often on relatively small watersheds, and they were built to maximize the safe yield of public drinking water supplies; they were not sited or constructed to augment downstream flows. And yet because they continue to exist in significant numbers throughout the state, they pose a unique challenge for any streamflow regulation.

As an example, Connecticut Water has 18 active public water supply reservoirs. Their watersheds range in size from 0.16 square miles – a scant 100 acres – to 16 square miles, with the average watershed being less than 3 ½ square miles in area, and a full thirty-nine percent (7 out of the 18) being under 1 ½ square miles in area. Of those having watersheds greater than 3 square miles, all but one are part of complex, integrated reservoir systems, with multiple reservoirs built in series, and often with very small impoundments being the terminus from which withdrawals are actually made.

The result is that in many instances, complying with the regulations' presumptive standards would be difficult, if not impossible to achieve. This is because the standard will, at times, require water to be released from storage in order to augment the natural flow coming into the impoundment. With reservoirs either having small watersheds or small storage ratios (fully one half of Connecticut Water's reservoirs store less than ten percent of the mean annual runoff of the watershed), compliance would regularly require the Company to make releases that exceed both inflow and our ability to augment flow from water remaining in storage. In essence, the regulation has the potential to significantly deplete the reservoir.

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[1] Conn. Joint Standing Committee Hearings, Env. Committee., Pt.11, 2005 Sess., at 3462.

Corresponding losses in safe yield and system available supply would mean that our Chester, Guilford and Stafford Springs water systems would suffer water supply shortages, affecting nine towns and approximately 20,000 customers.[2] Clearly, this outcome was not envisioned by the legislature. Nor, in all fairness, has it been advocated by the Department or other stakeholders. Our very real concern, however, is over unintended consequences that arise from a poorly tested regulation.

Most of the technical work to date has focused on releases from large, purely hypothetical impoundments. Universal application of the presumptive standards, however, has the clear potential to introduce risk by encouraging situations where water is released from storage too early or in such quantities that water systems find themselves in a state of supply drought or other form of emergency declaration with a degree of frequency not experienced previously in our state. As a result, we may well find ourselves not only restricting water uses, but also missing opportunities to augment streamflows during low-flow summer months. Clearly, this accrues to no one's benefit.

Before we move forward, it is vital that a more rigorous assessment be undertaken of the impact diverse release rules would have on the varied and various public water supply reservoirs actually serving the state's residents. Such testing should be undertaken on all public water supply sources and the impacts carefully measured. Only then, with the impacts known and the benefits defined should we move to implement any new release rule.

Opportunities for Improvement

We have recently had a number of meaningful discussions with The Nature Conservancy over ways some unforeseen issues might be addressed. As an example, there appears to be agreement that consideration needs to be given to establishing additional categories of impoundments – perhaps using a reservoir storage ratio criterion – that would drive a different flow standard, such as the lesser of inflow or 0.1 cfsm, similar to the rule proposed for impoundments having small watersheds. For extremely small watersheds (e.g., < 1 ½ mi^2), an outright exemption, in the true sense of the word, appears warranted.

As another example, emergency contingency plan "triggers" that curtail downstream releases during critical events have been shown to be necessary to utilities' ability to preserve safe yield. It is important that these triggers be uniformly applied under all potential release rules, whether they are a more complex bioperiod-type standard or straight 0.1 cfsm release requirement.

[2] A Class 1 or 2 designation would magnify the impact and potentially cause similar effects in our Northern and Naugatuck systems.

Water supply reservoirs – their construction, interconnectedness and methods of operation – are exceedingly diverse. A one-size-fits-all rule does not exist and additional effort must be made to assess alternative standards and operating rules. Arguably, this vetting should have been undertaken by the Commissioner's Policy and Implementation Workgroup, in concert with the Scientific and Technical Workgroup. We strongly encourage that the groups be reconvened for this purpose.

Groundwater Regulation and Good Science

As firmly as we believe in the legislative intent expressed by Senator Roraback and others, we also believe the regulations, as currently proposed, do not achieve the balance necessary to move forward at this time. Regrettably, they also constitute an egregious – albeit well-intentioned – example of regulatory over-reach when it comes to groundwater supplies. We have been unchanging in our position on this issue and will continue to advocate for the exclusion of wells from these regulations.[3]

Even were DEP to be substantiated in their position that the Legislature managed to give them the authority to regulate well withdrawals under these regulations, we believe the science behind the maximum alteration rule remains flawed and disproportionately impactful to water supply operations, available supply, and the Company's ability to meet public health and safety needs.

Attached to our testimony is an independent assessment provided by Wittman Hydro Planning Associates (WHPA) on the proposed regulations. WHPA is comprised of highly skilled engineers and scientists dedicated to the task of protecting the quality of rivers, lakes, streams, and aquifers. According to the WHPA review team, the regulations and guidance document, in summary, *"raised questions and concerns regarding the basis for limits established for withdrawals, the approach for evaluating withdrawals, and the intended versus actual burden on utilities to comply with the Proposed Regulations."*

WHPA's report identifies specific aspects of the proposed regulation which they question, as well as various recommendations proffered by them. Perhaps most noteworthy is their assessment that the studies on which the regulations are based *"do not support quantified regulation of streamflow for the purpose of protecting aquatic life. The Proposed Regulations are supported by the studies only in the general sense that reduced stream flow is expected to have adverse effects on stream biota, and limiting stream-flow reduction is a means of preventing or minimizing adverse effects. However, both documents are inconclusive regarding the ability to predict the effects of quantified water withdrawals on aquatic life."*

[3] See separate testimony provided by CWC on this issue.

The Shepaug as Example

The Shepaug River settlement agreement has been publically touted as a resounding success story by the Governor, the DEP, and various parties to the agreement – and rightfully so; the settlement mitigated an instance where concerns had been raised over the impact an historical impoundment was having on downstream water resources. In the end, it was demonstrated that the City of Waterbury could make additional streamflow releases and a resolution was crafted in a manner that appears to have balanced the public water supply interests of the City with environmental and other concerns. The settlement also paved the way for the 2005 legislation.

It is important to note, however, that the Shepaug's streamflow release rules fail to approximate the presumptive standards proposed under the regulations for similar impoundments. Whereas Connecticut Water and other utilities have projected significant impacts to safe yield under the proposed regulations, Waterbury's operating rules preserve 100 percent of their supply's safe yield while satisfying downstream interests. This was no fluke, but the outcome of careful deliberation.

As a result, it is not incongruous to at once support the Shepaug agreement and all it stands for, and continue to question whether the proposed regulations do in fact, strike the balance critical to their adoption. We were able to get it right with the Shepaug, and can and should make the effort to achieve similar balance elsewhere.

Moving Forward

There are substantive flaws with the proposed regulations that the Connecticut Water Works Association, Connecticut Water and other utilities have highlighted in their testimony and conveyed in earlier comments to the Commissioner. Indeed, the Department now acknowledges that it may not have gotten the balance right. That candor is appreciated, as is the genuine effort of individuals like Bureau Chief Betsey Wingfield to try to better understand utilities' unique concerns. However, it is as difficult to undo poorly-designed regulations as it is to put water back in a reservoir in the midst of a drought, and we cannot support moving forward with the regulations as drafted.

Here and elsewhere we have outlined specific suggestions that we believe are essential to moving forward. We believe it absolutely critical to focus on surface water impoundments, as intended by the law, so that a practical set of regulations can be developed and the benefits achieved. This would be a clear win for the environment and respect legislative and regulatory integrity. At the same time, we are willing to revisit groundwater withdrawals, using sound science and upon clear direction and authorization from the Legislature.

We also support the recommendations made by CWWA, believing they contain important fixes that will allow us to make progress on this important issue. Perhaps most constructive are calls to set aside our differences and focus our collective efforts on the immediate identification and mitigation of known flow-impaired water resources. All can and should be willing to support the wisdom of such an approach.

Public Act 05-142 requires the Commissioner to adopt regulations "after consultation and cooperation with the Department of Public Health, the Department of Public Utility Control [and] an advisory group convened by the Commissioner of Environmental Protection." We urge the Commissioner to reengage with the regulated community, state agencies and other stakeholders in a spirit of cooperation and toward the common goal of developing practical, balanced, and legally substantiated regulations. Connecticut Water remains committed to that cause.

Very truly yours,

David L. Radka
Director of Water Resources

Enc: January 21, 2010 WHPA Report:
"Review of 'Proposed Stream Flow Standards and Regulations' Pertaining to Groundwater Withdrawals"

Review of "Proposed Stream Flow Standards and Regulations" Pertaining to Groundwater Withdrawals

Regulations of Connecticut State Agencies (RCSA) Sec. 26-141b-1 to 26-141b-9

Prepared for:
Connecticut Water Company, Inc.
93 West Main Street
Clinton, Connecticut 06413

Prepared by:
Wittman Hydro Planning Associates, a Division of Layne Christensen
320 W 8th Street, Suite 201
Bloomington, Indiana 47404

January 21, 2010

Scope of Technical Review

Wittman Hydro Planning Associates (WHPA) was retained by the Connecticut Water Company, Inc. to provide a technical review of the *Proposed Stream Flow Standards and Regulations* (Proposed Regulations) as they pertain to groundwater withdrawals and the draft *Guidelines for Evaluating Stream Flow Depletion from Groundwater Withdrawals* (Guidelines).

The purpose of the review was to determine if the studies used by the Connecticut Department of Environmental Protection (DEP) to draft the Proposed Regulations support those regulations; determine if the Proposed Regulations and Guidelines accomplish the legislative objectives; evaluate the use of modeling to determine the impacts of groundwater withdrawals; and consider alternative methods.

WHPA reviewed documents pertaining to the development and adoption of the Proposed Regulations and Guidelines. These documents include:

1. *Fish Assemblage Responses to Water Withdrawals and Water Supply Reservoirs in Piedmont Streams* (Freeman, et al, 2006);
2. *Evaluating Effects of Water Withdrawals and Impoundments on Fish Assemblages in Connecticut Streams* (Vokoun, et al, 2009);
3. *Proposed Streamflow Standards and Regulations* (DEP, 10/13/2009);
4. *Guidelines for Evaluating Groundwater Withdrawals against the Streamflow Standards* (DEP, 12/17/2009); and
5. *Stream Flow: The next Two Decades* (DEP, 1/29/2009).

In addition, WHPA completed a literature review of published research pertaining to streamflow depletion by pumping wells.

Using data provided by the Connecticut Water Company, modeling was performed according to the Guidelines for the purpose of evaluating the results and required effort. Streamflow depletion modeling was performed using STRMDEPL08 with both standard (Tier 3) and site-specific (Tier 4a) parameters. Numerical modeling was also performed using models previously developed for Level A mapping. WHPA contacted DEP and the U.S. Geological Survey (USGS) to obtain guidance on estimating Q99 streamflows. The modeling results were evaluated in terms of their accuracy, and usefulness for a tiered approach to assessment of withdrawals.

Comments

Review of the Proposed Regulations and Guidelines raised questions and concerns regarding the basis for limits established for withdrawals, the approach for evaluating withdrawals, and the intended versus actual burden on utilities to comply with the Proposed Regulations.

Questionable Connection to Aquatic Impacts

The studies (Freeman, et al, 2006; Vokoun, et al, 2009) on which the Proposed Regulations are based do not support quantified regulation of streamflow for the purpose of protecting aquatic life. The Proposed Regulations are supported by the studies only in the general sense that reduced stream flow is expected to have adverse effects on stream biota, and limiting stream-flow reduction is a means of preventing or minimizing adverse effects. However, both documents are inconclusive regarding the ability to predict the effects of quantified water withdrawals on aquatic life.

- Both studies used very little real stream flow data and relied on estimates of base flow in un-gauged stream segments, limiting their use as a basis for the quantified regulation of stream flow for specific, individual streams.
- Neither of the studies provides a basis for the selection of bioperiods or the maximum flow reduction values for different bioperiods and classes of streams, as presented in the Proposed Regulations.
- The limits on withdrawals imposed by the Proposed Regulations are more restrictive and applied more broadly than is required to protect aquatic life in streams. During the entire four month Rearing and Growth Bioperiod, severe cutbacks in pumping from public water supply wells may be required, regardless of actual streamflow. Actual streamflow during much or all of that period will likely be greater than the estimated Annual Q99.
- The paper by Freeman and Marcinek appears in an archived scientific journal, and therefore the methods and conclusions have been reviewed and commented on by peers of the same profession prior to publication. It is unclear if the project report by Vokoun and Kanno has been peer-reviewed, which raises questions about the validity of the results and conclusions.

Recommendation: We recommend revisions to the Proposed Regulations for Class 2 and Class 3 streams in which streamflow at a wellfield is monitored during the critical bioperiod. Limits on groundwater withdrawals would only be triggered if monitoring shows that streamflow drops below critical levels. The limits on withdrawals would last only as long as the streamflow is below critical levels. The critical flows and

withdrawal limits should be tiered to adjust to changing streamflow conditions. The trigger flow rates and withdrawal limits should be determined based on site-specific information. The Proposed Regulations should allow for modification of the trigger levels and withdrawal limits as a history of streamflow measurements are acquired and assessed at individual sites.

Questionable Guidance for Evaluating Groundwater Withdrawals

A tiered approach as described in the Guidelines for evaluating the alteration of streamflow caused by groundwater withdrawals seems practical. However, it is not clear that the Guidelines accomplish the objective of the Proposed Regulations, and many details on the implementation of the guidance are unclear or poorly-conceived.

- Tier 1 Analysis – Initial Assessment. This analysis based on the maximum allowable withdrawal rate provides a reasonable starting point for assessment of stream flow depletion.
- Tier 2 Analysis – Actual Use Assessment. This analysis using actual pumping data is a reasonable next step.
- Tier 3 Analysis – Analytical Evaluation. STRMDEPL08 modeling using standard parameters does not provide a reasonable estimate of stream flow depletion and cannot reasonably be used to evaluate compliance with the proposed regulations. The standard parameters do not necessarily produce a conservative estimate of stream depletion.
- Tier 4a Analysis – Alternative Analytical Evaluation. STRMDEPL08 modeling with site-specific data is useful for evaluation of rates of stream depletion.
- Tier 5b Analysis – Numerical Modeling. The use of models from Level A mapping studies with site-specific data is also appropriate to evaluate rates of stream depletion during critical bioperiods.

Recommendation: It is recommended that the Tier 3 analysis be removed from the Guidelines. Stream depletion modeling with site-specific parameters provides insight as to how the operating regime of a wellfield impacts stream flow during critical bioperiods. This insight should be used as part of any watershed management plan.

Cost to Utilities and Utility Customers

The Proposed Regulation will impose costs on utilities and their customers. That cost is justified if the regulation will limit impacts to aquatic life. However, the lack of available data brings into question the appropriateness of the proposed withdrawal limits for the purpose of protecting aquatic life in specific streams. Furthermore, uncertainty surrounding the

impact in later phases of the Proposed Regulations on the continued operation of water supply wells will increase the costs of compliance to utilities and their customers.

- While the proposed regulations are based on maintaining some minimum stream flow rate during the various bioperiods, calculation of the Q99 bioperiods is not discussed. Thus, it is not possible at present to assess the impact of the Proposed Regulations to continued water supply operations at specific well fields.
- Estimation of both stream flow and groundwater depletion volumes using statistical analyses and computer models can't reliably predict impacts to aquatic life in individual streams. To continue operations, many utilities will be required to directly evaluate alteration of stream flow in local streams. This will require a large amount of both hydrologic and water quality data, and the development of monitoring plans for some streams. The Proposed Regulations appear to place the financial burden for collecting this data primarily upon water utilities and their customers, although benefits attribute to all citizens of the state.
- The initial level of effort and cost incurred by some utilities and their customers may be greater than apparently intended by the phased approach to implementation in the Proposed Regulations. Many utilities will be required to make investments in the first five years in order to comply with individual-basis withdrawal limits beginning in year six. Regulation on the basis of cumulative diversions will further limit withdrawals beginning in year eleven. Uncertainty regarding limits imposed on the basis of cumulative diversions will challenge utilities to make prudent investment decisions during the first five years. Utilities may be required to accelerate planning and investments on the basis of cumulative withdrawals in order to avoid unnecessary investment in inadequate facilities.

Recommendations: Due to the large number of wells and well fields in the state, as well as the high potential cost to utilities and their customers, it is recommended to prioritize those well fields for which withdrawals have the greatest potential for impact to aquatic life in streams. Our review suggests that the state and utilities should cooperate to collect daily groundwater and surface water temperatures at the high-priority sites for a year or more. This data can provide valuable information with respect to the magnitude of hydrologic influence from local surface water bodies as opposed to regional groundwater flow. Because all of the state's citizens will benefit from protection of aquatic life, it is recommended that the state fund increased streamflow monitoring and further assessment of the impact of withdrawals on aquatic life at the high-priority sites.

Adaptive Management

The Freeman (et al, 2006) study discusses the concept of "Adaptive Management". Adaptive management is the concept of diversifying resources; specifically, by means of withdrawing water from multiple source locations instead of from one or two centralized areas. It is our belief that it will be beneficial for most utilities to work with the state to evaluate their ability to "spread out the load" across multiple wells and well fields.

- Many utilities may ultimately be required to enter into Flow Management Plans in order to prevent unmanageable restrictions in groundwater withdrawals. Flow Management Plans would require actual streamflow data, biological or habitat studies, and additional modeling. These plans are contemplated in the Proposed Regulation as an alternative to the presumptive standards.
- Achieving the legislative intent of balancing the needs of humans with the needs of fish and wildlife will in many cases require a site-specific, adaptive approach.
- Development and management of Flow Management Plans will require significant resources and coordination between users and the state. This is due in part to the current lack of available streamflow data.

Recommendations: It is recommended that the DEP acknowledge that in order to comply with the Proposed Regulations, many utilities will be compelled to dedicate the time and resources required to develop, negotiate, and implement Flow Management Plans. In support of this, and because the benefits of protecting aquatic life accrue to all of the citizens of the state, the state should fund increased streamflow monitoring and assessments, as previously recommended.

Wittman Hydro Planning Associates

WHPA is a team of highly trained engineers and scientists who are dedicated to the task of protecting the quality of rivers, lakes, streams, and aquifers. Most of our projects require a particular mix of experience and skill in quantitative earth sciences. The principal professionals at WHPA have been consultants, researchers, and scientists in a variety of settings for more than two decades. They have worked for the federal government, state water agencies, the American Water Works Association, municipal utilities, private research institutes, state environmental protection agencies, and Indian nations. The group is technically adept, and with experience that is geographically diverse. WHPA staff that engaged in the review of the proposed Standards and Guidelines include Jack Wittman, PhD; Erik Anderson, PhD, PE; William Gollnitz; and Daniel Haddock, PE.

JACK WITTMAN, PH.D., CGWP
President

Jack's areas of expertise include water resource modeling, hydrologic analysis, and water supply planning. He is active in the field both locally and nationally. He is a recognized expert in the application of hydrologic models to water supply protection and development. He has a broad range of hydrologic analysis experience that includes evaluating watershed response to changing land use, review of high level nuclear waste repository performance, impacts of irrigated agriculture on ground and surface water quality, climate change effects on groundwater supplies, and drinking water protection. His career has been defined by an interest in understanding the hydrologic system and the processes that determine the abundance and quality of our water supply.

Dr. Wittman has written research reports, technical guidance documents, and journal articles. He has designed and taught graduate level courses in soil science and engineering, undergraduate courses in groundwater modeling and environmental methods, presented a short-course about the use of models in environmental regulation, and several short courses on water supply modeling. He has served as a regular consultant to the Electric Power Research Institute and the U.S. Environmental Protection Agency in relation to implementing various provisions the Safe Drinking Water Act and is a governor's appointee to the TMDL guidance committee.

Jack is actively involved with committees of the ASTM (Committee D18 on Soil and Rock), the AWWA Research Foundation, and the Indiana Rural Water Association. He is a past president of the Indiana Water Resources Association (2002). Dr. Wittman has made presentations at national and international conferences about the role of modeling and the use of public data to determine susceptibility of drinking water supplies.

Prior to founding WHPA, Dr. Wittman was a Senior Research Scientist in the School of Public and Environmental Affairs at Indiana University (Indianapolis), a Senior Research Hydrologist at Indiana University (Bloomington), a private consultant in Washington State, the Technical Program Manager for the Yakima Indiana Nation Nuclear Waste Office, the Associate Director of the Utah High Level Nuclear Waste Office, and a drinking water treatment plant operator in Salt Lake City, Utah. Dr. Wittman has a B.S. in Environmental Studies and a M.S. in Watershed Science from Utah State University, and a PhD in Environmental Science from Indiana University, Bloomington.

WILLIAM D. GOLLNITZ
Senior Environmental Scientist/Riverbank Filtration Specialist
William Gollnitz is a Senior Environmental Scientist with WHPA. He provides expertise in municipal water supply development, protection, treatment and management. During his 36 years in the industry William has managed water utilities in New York, Rhode Island and Ohio, and has consulted for many others throughout the United States. As a utility manager, he has successfully completed a wide-variety of projects including municipal watershed management for timber harvesting and oil and gas well development; the development of source water protection plans for both surface water and groundwater sources, water treatment evaluations including simultaneous compliance issues, and the construction of capital improvements ranging from intake systems, pump houses, unit treatment processes, and distribution storage facilities.

William also specializes in surface water/groundwater interactions including "groundwater under the direct influence of surface water" (GWUDISW) and "riverbank filtration" (RBF). Since the early 1990s, he has been active in developing and evaluating GWUDISW protocols. This work ultimately led him to the Greater Cincinnati Water Works where he successfully completed an extensive Flowpath Study to develop a method for evaluating the removal of pathogenic protozoa using RBF under various rates of recharge. As a consultant, William has successfully obtained credit for RBF under the Surface Water Treatment Rules for the Central Wyoming Regional Water System in Casper, Wyoming and the City of Kennewick, Washington. In fact, the Casper project is the only case study where the US Environmental Protection Agency has recognized RBF as the primary filtration process in lieu of engineered treatment. The project ultimately saved the utility over $20 million by not having to construct a conventional surface water plant to treat groundwater from the well field.

William holds a B.S. degree in Biology from Mount Union College; and a M.S. degree in Environmental Science-Water Resources from the State University of New York, College of Environmental Science and Forestry. He has over twenty-five peer-reviewed publications; two of which have won distinguished awards from the American Water Works Association (AWWA). And, he has given numerous presentations at various water resource conferences in the United States. William has also participated as a presenter in the AWWA's Webcast – "Riverbank Filtration – The Natural Way".

ERIK ANDERSON, PH.D., P.E.
Senior Scientist
Erik Anderson is a professional engineer specializing in groundwater and surface water mechanics. Erik has BS and MS degrees in Civil and Environmental Engineering from the University of Wisconsin-Madison, and a Ph.D. in Civil Engineering from the University of Minnesota. He has worked as a design engineer/consultant in Wisconsin and Minnesota, and as an assistant professor of Civil Engineering at the University of South Carolina.

As a consulting engineer, he has worked for 19 years on numerous water resources projects throughout the Midwest. His work has included dam design and rehabilitation, surface water modeling including dam-failure analyses and flood insurance studies, regional groundwater flow modeling for water supply and availability studies and wellhead protection studies, seepage studies, and large scale dewatering design. He has developed analytical methods for addressing groundwater flow problems with leaky boundaries and internal boundaries. The methods have been applied to

solve problems of flow to clogged streambeds, pumping wells near partially-penetrating streams, and flow in faulted single and multi-aquifer systems.

DAN HADDOCK, P.E.
Senior Project Manager
Daniel is a professional engineer registered in 7 states with 19 years of experience in varied aspects of water utility engineering and management. His work has included utility master planning, water demand forecasting, conservation planning, hydraulic modeling of water distribution systems, permitting, life-cycle cost analysis, and infrastructure design and construction. Previously, as manager of engineering for an investor-owned utility, he was responsible for comprehensive planning of utility infrastructure, development and management of capital investment programs, and the execution of infrastructure projects in water supply, treatment and distribution for 35 utilities in 4 states. He has interacted with regulatory agencies on a range of issues involving proposed rules, environmental permitting and compliance. He has provided written and oral testimony to state utility regulatory commissions related to water rates, approval of major infrastructure projects, and territorial disputes.

Daniel holds a B.S. degree in Mechanical Engineering from Rice University. He is a member of several committees, including the AWWA's Water Conservation Planning, Evaluation & Research Committee, AWWA Water Resource Planning & Management Committee, and the Indiana Utility Regulatory Commission Water Rate Design Committee.